

TECHNICAL MEMORANDUM

TO: Carl Bach, The Boeing Company
FROM: *cmg* Colette Griffith and *KJH* Kristy J. Hendrickson, P.E.
DATE: November 18, 2010
RE: **PCB PAINT ABATEMENT ACTIVITIES
NORTH BOEING FIELD
SEATTLE, WASHINGTON**

This technical memorandum has been prepared to document paint abatement activities that were performed at North Boeing Field (NBF) in October 2010. Paint was removed from focused areas of yellow-painted bollards and support structures at NBF based on concentrations of polychlorinated biphenyls (PCBs) detected in paint samples collected and analyzed during the North Lateral Source Evaluation (NLSE, Landau Associates 2010a). The Boeing Company (Boeing) began abatement of paint in the North Lateral area in October 2010 in general accordance with the procedures described in the Concrete Joint Removal Work Plan (Work Plan, Landau Associates 2010b) and Addendum No. 1 of the Concrete Joint Removal Work Plan (Landau Associates 2010c). Based on concentrations of PCBs detected in paint during the NLSE at greater than or equal to 50 milligrams per kilogram (mg/kg), abatement of all removed paint was performed in accordance with the Toxic Substances Control Act (TSCA) requirements described in the Work Plan, regardless of known or suspected concentrations. Paint characterization, paint abatement activities, runoff control, management of waste, and decontamination procedures are described in the sections below.

PAINT CHARACTERIZATION RESULTS

Yellow paint was sampled from 14 bollard structures and 1 equipment support structure located throughout the NBF North Lateral area. PCBs were not detected at seven of the locations; PCBs were detected at concentrations ranging from 1.1 mg/kg to 2,300 mg/kg at the remaining eight locations. PCBs were detected at three of those eight locations at concentrations greater than or equal to 50 mg/kg. Results of the yellow paint samples from locations described above that prompted paint abatement activities are shown on Figure 1 and are also summarized in Table 1.

Based on the above-described samples, field personnel identified additional areas of yellow-painted bollards that appeared to have similar paint and age characteristics as those with detected PCB concentrations. Abatement activities were conducted at these locations as described in the following sections.

PAINT MATERIAL ABATEMENT ACTIVITIES

Paint was removed as TSCA waste from all bollards and support structures with yellow paint, which includes all of the locations listed in Table 1 where PCBs were detected above reporting limits, with the exception of sample location PAINT82. This location was not accessible during paint abatement activities due to storm drain line replacement and PCB excavation work that was taking place concurrently with the paint abatement work. The location representative of PAINT82 will be addressed during future paint abatement activities. As discussed above, paint was also removed from additional areas of bollards based on visual appearance or age similar to areas of known detected concentrations.

Paint abatement activities were performed by Grayhawk Construction. Grayhawk Construction is a general contractor for Boeing and has experience performing lead-based paint abatement activities on Boeing properties. PCB-paint abatement activities were performed in general accordance with Boeing's established procedures for lead-based paint abatement. Removed paint from all locations was considered to be TSCA waste regardless of known or suspected concentrations. No additional paint chip samples were collected as part of PCB-paint abatement activities, and additional locations that were identified for abatement based on similar paint characteristics or suspected age were considered to be TSCA waste and handled as such.

Grayhawk Construction used Peel Away®ST-1, formulated for steel-surface paint removal during paint abatement activities. Peel Away®ST-1 is a water-based, high viscosity alkaline paste with high adhesion characteristics that is specially formulated for the removal of lead-based paint and/or other coatings from steel structures. Peel Away®ST-1 is non-toxic and contains no flammable solvents; the technical specification data sheet and the material safety data sheet (MSDS) for this product are provided as Attachment 1. Generally, all paint was removed after one to two applications of Peel Away®ST-1. Following complete removal of paint from the surface, an anti-rust sealant was applied to the structure in preparation for repainting. Each bollard location was repainted by Glacier Environmental.

RUNOFF CONTROL, MANAGEMENT OF WASTE, AND DECONTAMINATION

Runoff control, management of waste, and decontamination procedures for the abatement of the building materials identified as TSCA waste conformed to the procedures described in Sections 3.2, 3.3, and 3.4 of the Work Plan.

Runoff control measures were implemented to capture any wastewater, slurry, or debris generated during paint abatement activities to prevent the materials from entering the stormwater drainage system; however, due to the high viscosity and adhesion characteristics of the Peel Away®ST-1 removal product, very little slurry and/or debris was generated as a result of paint abatement activities. Control measures that were implemented, if required, included the use of air-powered drum vacuums with particulate filters and dust control mitigation, and catch basin filters and other control devices. Where possible, tented

structures completely lined with plastic on the walls and surface were used to contain all paint abatement activities in a confined area and prevent exposure to human health and the environment. Paint abatement activities were halted during periods of significant wind and rain. Detailed runoff control measures implemented for removal of TSCA waste are described in detail in Section 3.2 of the Work Plan.

All wastewater generated during abatement of PCB-containing paint and wastewater generated during decontamination activities was contained and properly managed as remediation waste under TSCA in accordance with the self-implementing requirements in 40 C.F.R. 761.61(a). Treated wastewater that met the NBF Sweeper Decant Station's discharge limits, as required by Boeing's King County Industrial Waste Permit, was discharged to the sanitary sewer. All solid waste containing PCBs greater than 50 mg/kg was contained in drums, cubic yard boxes, or lined roll-off boxes and disposed of at the Waste Management NW landfill in Arlington, Oregon, a chemical waste landfill permitted under 40 C.F.R. § 761.75 to accept TSCA waste. Management of waste is described in detail in Section 3.3 of the Work Plan.

Non-disposable and nonporous equipment such as paint removal tools, scrapers, and other small equipment that came into contact with TSCA waste was decontaminated after each use in accordance with the decontamination procedures required under 40 C.F.R. § 761.79, or was discarded as contaminated TSCA waste and placed in a roll-off box to be disposed of at Waste Management NW landfill in Arlington, Oregon, a Subtitle C chemical waste landfill permitted to accept TSCA waste under 40 C.F.R. § 761.75. All wastewater generated during decontamination was collected and treated at the NBF Sweeper Decant Station as described in the paragraph above and in Section 3.3 of the Work Plan. Decontamination procedures are described in detail in Section 3.4 of the Work Plan.

HEALTH AND SAFETY PLAN

The project health and safety plan (HASP) provided in the Work Plan was applicable to all activities performed under this technical memorandum. The health and safety plan is provided in Appendix A of the Work Plan. All personnel performing the work followed the procedures described in this HASP or followed procedures in a HASP that is at least as protective as this plan.

SCHEDULE

The paint abatement activities described in this technical memorandum were conducted in October 2010. Additional paint abatement activities will not be conducted until the weather warms up in the spring; the paint removal material used is not effective in temperatures below about 50 degrees Fahrenheit. Additional wipe samples of painted materials will be collected during the first quarter of 2011 as described in the *Planned Sampling Activities to Indicate Presence of PCBs in Paint* Technical Memorandum (Landau Associates, 2010d). PCB paint abatement activities will resume in second quarter

of 2011, as needed, based on the results of the Proposed Wipe Sampling Activities. Documentation of abatement activities similar to this technical memorandum will be provided to the regulatory agencies on a periodic basis.

REFERENCES

Landau Associates. 2010a. *Report, North Lateral Storm Drain System Evaluation of Potential Sources, North Boeing Field, Seattle, Washington*. Prepared for The Boeing Company. October 13.

Landau Associates. 2010b. *Work Plan, Concrete Joint Removal, North Boeing Field, Seattle, Washington*. Prepared for The Boeing Company. June 29.

Landau Associates. 2010c. Technical Memorandum to Carl Bach, The Boeing Company, re: *Work Plan Addendum No. 1, Concrete Joint Removal, North Boeing Field, Seattle, Washington*. Colette Griffith and Kristy J. Hendrickson, Landau Associates. September 1.

Landau Associates. 2010d. Technical Memorandum to Carl Bach, The Boeing Company, re: *Planned Sampling, to Indicate Presence of PCBs in Paint, North Boeing Field, Seattle, Washington*. Colette Griffith and Kristy J. Hendrickson, Landau Associates. November 17.



TABLE 1
SUMMARY OF PCBs IN PAINT FOR ABATEMENT ACTIVITIES
NORTH BOEING FIELD
SEATTLE, WASHINGTON

Sample Name	Sample Type	Date Sampled	Associated/Nearest Building Number	PCB Concentration (mg/kg)	Sample Location Notes
NLS-PAINT01-072010	Paint Chips	7/20/2010	3-333	Not detected	Collected from peeling yellow paint on bollards located north of Building 3-333, east of D333B.
NLS-PAINT08-072010	Paint Chips	7/20/2010	3-353	1700	Collected from peeling yellow paint on the yellow bollards located at the northwest corner of Building 3-353.
NLS-PAINT14-072210	Paint Chips	7/22/2010	3-342	Not detected	Collected from the peeling yellow paint on bollards near CB133B on the south side of Building 3-342.
NLS-PAINT38-072610	Paint Chips	7/26/2010	3-323	750	Collected from the yellow bollards near the northwest corner of the cylinder tanks located just adjacent to Building 3-323.
NLS-PAINT66-072810	Paint Chips	7/28/2010	3-322/3-326	12.1	Collected from the yellow metal support beams located between Buildings 3-322 and 3-326.
NLS-PAINT74-080310	Paint Chips	8/3/2010	3-326	2300	Collected from yellow bollards with layers of yellow and white paint located near door W3 on the west side of Building 3-326.
NLS-PAINT75-080310	Paint Chips	8/3/2010	3-334/3-333	Not detected	Collected from yellow bollards with layers of yellow and white paint located to the east of the fuel test area and D153C, directly west and across the road from Building 3-334.
NLS-PAINT76-080310	Paint Chips	8/3/2010	3-333	Not detected	Collected from yellow bollards (only one layer of paint) on the west side of Building 3-333.
NLS-PAINT77-080310	Paint Chips	8/3/2010	3-342	Not detected	Collected from yellow bollards with layers of yellow and white paint located on the southwest corner of the decant facility, adjacent to Building 3-342.
NLS-PAINT78-080310	Paint Chips	8/3/2010	3-315	Not detected	Collected from yellow bollards with layers of yellow and white paint located on the northwest corner of Building 3-315.
NLS-PAINT79-080310	Paint Chips	8/3/2010	3-323/3-324	1.7	Collected from yellow bollards with layers of yellow and white paint located on the east side of Buildings 3-323 and 3-324 near the evaporators and CB182A.
NLS-PAINT80-080410	Paint Chips	8/4/2010	3-315	4.6	Collected from yellow bollards with layers of yellow and white paint near the southwest corner of Building 3-315 just west of door S1.
NLS-PAINT81-080410	Paint Chips	8/4/2010	3-313	Not detected	Collected from yellow bollards with layers of yellow and white paint located near the west side of Building 3-313, directly west of the drum yard gate.
NLS-PAINT82-080410	Paint Chips	8/4/2010	3-302	1.1	Collected from the yellow bollards (only one layer of paint) on the north side of Building 3-302.
NLS-PAINT83-080410	Paint Chips	8/4/2010	3-365	46	Collected from yellow bollards with two layers of paint (light/dark yellow) located on the north side of the storage hangar located north of Building 3-365.

Peel Away®ST-1 Technical Specifications & MSDS

Peel Away[®] st-1 Steel-Surface Paint Remover

1. **Product Description & Use:** Peel Away[®]ST-1 is a water based, high viscosity alkaline paste, providing high build and high adhesion characteristics, that is specifically formulated for the removal of lead-based paint and/or other coatings from steel structures including water and other storage tanks, bridges, etc. This product contains no toxic or flammable solvents. In most cases, a single application of Peel Away[®]ST-1 will remove multiple layers of old paint. Apply Peel Away[®]ST-1 by trowel or spray; it adheres quickly and will cling to vertical, horizontal and overhead surfaces. Its self-sealing characteristic allows Peel Away[®]ST-1 to remain moist and continue working throughout the removal process, without requiring any cover.
2. **Features & Benefits**
 - One application will remove lead-based and oil-based paints and coatings from steel structures
 - Self-sealing paste controls dispersal of lead dust during removal process
 - Non-toxic, water-based, biodegradable formula does not include methylene chloride or flammable solvents
 - High build, high adhesion characteristics increase adhesion to vertical, horizontal and overhead surfaces
3. **Limitations:** Product efficiency is reduced below temperature of 40°F. Ideal ambient conditions are temperatures above 50°F, with high relative humidity. An alkaline product, Peel Away[®]ST-1 will not work on epoxies, urethanes, chlorinated rubber, or other chemically resistant coatings. (Peel Away[®] 7 is recommended for removing epoxies, urethanes, chlorinated rubber, and other chemically resistant coatings.)
4. **Test Patch:** Always prepare a test area on each type of surface and paint coating prior to full application. Testing before beginning the project is the best way to determine how thickly to apply Peel Away[®]ST-1 to ensure a complete strip with one application, and how long it must remain in place (dwell time) before removing. Applying the paste too thickly or unevenly, or, removing it too quickly, may result in need for more than one application, increasing your labor and material costs.
5. **Preparation:** Cover and protect areas where stripping is not desired, including adjoining surfaces where overspray may travel. Polyethylene and masking tape create an effective barrier. Plants and other foliage should be covered during application. Proper job site preparation will ensure that all chemical stripper residues will be contained in accordance with local and federal guidelines applying to lead-based paint. Generally, job sites where Peel Away[®]ST-1 is used require only that spent residues not contact with ground or water. For general guidelines covering chemical stripping containment, consult Steel Structures Painting Council Guide 6.
6. **Application & Spread Rate:** Peel Away[®]ST-1 can be hand-trowelled or sprayed using a GRACO King or President airspray pump adapted for this product. Patch test results will determine how thickly to apply this product to ensure that a single application will completely remove old coatings. Dwell time is generally between 12 to 24 hours, depending on test patch results. Peel Away[®]ST-1 provides an average spread rate of 20 – 25 square feet per gallon at 0.060 inch wet film thickness; results may vary.
7. **Removal:** Peel Away[®]ST-1 residues are generally removed using broadknives for bulk removal, followed by a low pressure, low volume rinse using an airless paint pump, with a 0.018-0.021 inch tip, assuring that liquid waste will be minimized. Direct residues to containment surfaces for collection before disposal. Follow all appropriate guidelines for residue/waste collection and disposal. Alternate removal processes such as Ice Blast or CO2 blasting may be used if applicable. Pressure washing is not recommended as it produces a greater volume of liquid waste, which may contain lead.

8. **Clean Up:** Test Peel Away®ST-1 residue/waste for hazardous materials before disposing; test results will determine disposal process. After testing, follow appropriate federal, state and local disposal guidelines.
9. **Surface Preparation before repainting:** Steel surfaces stripped with Peel Away®ST-1 will generally exhibit some degree of alkalinity, and may require an additional water rinse, or rinsing with Peel Away® Neutralizer, may be required based on paint manufacturer recommendations. In addition, an SSPC SP-6 or SP-7 blast may be required prior to painting, again based on painting requirements. When working with previously profiled steel surfaces, surface tolerant coatings can be used, thereby eliminating any subsequent abrasive blasting. In any case, always verify surface pH before recoating.
10. **Availability & Cost:** Peel Away® products are available through a nationwide network of paint and hardware stores, and construction and safety supply distributors. For outlet nearest you, call 800-245-1191 or email plaway@aol.com. Cost will vary depending upon conditions and number of coats to be removed. Peel Away®ST-1 provides an average coverage rate of 20 – 25 square feet per gallon at 0.060 inch wet film thickness.
11. **Precautions & Safety Requirements:** Wear long rubber or latex gloves, and face shield or goggles. Wear suitable protective clothing if removing with a pressure washer. Wear a carbon filter mask or its equivalent when working in a confined area. Follow manufacturer instructions when spraying.
12. **Warranty:** Dumond Chemicals, Inc. warrants all of its products to be free from defects, and makes

no other warranties with respect to its products. Express or implied, including without limitation the implied warranties of MERCHANTABILITY OF FITNESS FOR PARTICULAR PURPOSE. Dumond Chemicals, Inc. liability shall be limited in all events to supplying sufficient products to re-treat the specific areas to which defective product has been applied. Dumond Chemicals, Inc. shall have no other liability, including liability for incidental, consequential or resultant damages whether due to breach of warranty or negligence. This warranty may not be modified or extended by representatives or Dumond Chemicals, Inc. or its distributors, and dealers.

13. **Technical Services:** Dumond's expert staff is available to answer technical questions and provide product-specific information required by architects, specifiers, contractors and property owners. Expert, on-site assistance is available at no additional cost. Call 800-245-1191 or email plaway@aol.com with product or technical questions.

Technical Data

Physical Form:	Blue Paste
Viscosity:	26.5
Flash Point:	None
VOCs:	None
pH:	13.0

Material Safety Data Sheet

Date last reviewed: January 1, 2008

I. General Information

Chemical Name & Synonyms Proprietary Blend	Trade Name & Synonyms Peel Away ST-1
Chemical Family Alkaline	Formula Mixture
Proper DOT Shipping Name Containers 2.2 lbs. (1 kg) or smaller: ORM-D Containers greater than 2.2 lbs. (1 kg): Sodium Hydroxide Solid Mixture, 8, UN1823, PGII	DOT Hazard Classification Class 8, PGII (Corrosive Material)
Manufacturer Dumond Chemicals, Inc.	Manufacturer's Phone Number (212) 869-6350
Manufacturer's Address 1501 Broadway, New York, NY 10036	Emergency Number: (800) 457-4280

II. Ingredients

Principal Hazardous Components	CAS #	Percent	PEL	TLV
Calcium Hydroxide	1305-62-0	21	5 mg/m ³ TWA (respirable fraction)	5 mg/m ³ TWA
Magnesium Hydroxide	1309-42-8	16	None Established	None Established
Sodium Hydroxide	1310-73-2	9	2 mg/m ³ TWA	2 mg/m ³ Ceiling
Non-hazardous Ingredients	N/A	Balance	None Established	None Established

SARA 313: This product contains no chemicals that are regulated under SARA Title III, section 313.

III. Physical Data

Boiling Point (°F) Greater than 212	Specific Gravity (H ₂ O =1) 1.33
Vapor Pressure (mm Hg @ 20°C) same as water	Percent Volatile by Volume (%) 50
Vapor Density (Air=1) same as water	Evaporation Rate (Butyl Acetate =1) same as water
Solubility in Water Complete	pH 13
Appearance & Odor Blue paste, no odor.	

IV. Fire & Explosion Hazard Data

Flash Point (Test Method) None	Autoignition Temperature None		
Flammable Limits None	LEL N/A	UEL N/A	
Extinguishing Media This material is not combustible. Use media appropriate for the surrounding fire.			
Special Fire Fighting Procedures Wear full emergency equipment and NIOSH approved positive pressure SCBA. Cool containers with water.			
Unusual Fire & Explosion Hazards At elevated temperatures containers may rupture. Contents are corrosive. All personal contact should be avoided.			
HMIS Ratings	Health: 3	Flammability: 0	Reactivity: 0

V. Health Hazard Data

OSHA Permissible Exposure Limit See Section II	ACGIH Threshold Limit Value See Section II
Carcinogen - NTP Program No	Carcinogen - IARC No
Symptoms of Exposure Acute Effects: Eyes: May cause severe burns with possible permanent damage. Skin: May cause chemical burns with reddening and pain. Inhalation: May cause eye and respiratory irritation. Ingestion: May cause burns to mouth and gastrointestinal corrosion. Chronic Effects: Repeated skin contact with dilute solutions or mists may cause dermatitis.	
Medical Conditions Aggravated By Exposure: Individuals with chronic respiratory or skin diseases may be at risk from exposure.	
Primary Route(s) of Entry Eye, skin, ingestion	
Emergency First Aid Eye: Flush with water for 30 minutes. Get immediate medical attention. Skin: Flush thoroughly w/water for 15 minutes. Remove contaminated clothing. Get medical attention for irritation. Inhalation: Remove to fresh air. Get immediate medical attention. Ingestion: If conscious, give water or milk. Do not induce vomiting. Get immediate medical attention.	

IV. Reactivity Data

Stability	X	Unstable Stable	Conditions to Avoid N/A
Incompatibility Acids, flammable liquids, organic halogens, nitromethane and metals such as aluminum, tin or zinc.			
Hazardous Polymerization	X	May Occur Will Not Occur	Conditions to Avoid N/A
Hazardous Decomposition None known.			

VII. Environmental Protection Procedures

Spill Response Wear appropriate protective clothing. Collect into closable containers. Wash spill area with water. Prevent runoff from entering sewers or waterways. Report spills as required.
Waste Disposal Method Dispose of in accordance with all state, local and federal regulations.

VIII. Special Protection Information

Eye Protection Chemical safety goggles/Faceshield	Skin Protection Rubber or neoprene gloves
Respiratory Protection (Specific Type) For spray application, wear a NIOSH approved dust respirator & eye protection.	Ventilation Recommended None normally required. If exposure limits are exceeded, local exhaust may be required.
Other Protection Impervious apron, boots, safety shower, eye wash as needed.	

IX. Special Precautions

Hygienic Practices in Handling & Storage Store in a cool, well ventilated area away from acids and other incompatible substances.
Work Practices Prevent eye and skin contact. Do not breathe mists or aerosols.
Other Precautions Use only with appropriate protective equipment. Wash thoroughly after use.